We Claim:

1. An IGBT with a monolithically integrated antiparallel diode, comprising:

a semiconductor substrate forming an inner zone and having a front side, a rear side, and a peripheral high-voltage edge;

said front side of said semiconductor substrate having semiconductor wells of a first conductivity type formed therein with transistor cells within said peripheral high-voltage edge;

at least one emitter region of the first conductivity type formed at said rear side of said semiconductor substrate;

at least one emitter short region of a second conductivity type integrated substantially only in a region of said high-voltage edge, said at least one emitter short region lying in a plane with said at least one emitter region and forming an electrode of the antiparallel diode;

said at least one emitter region having no emitter short regions within said high-voltage edge; and

said semiconductor wells on said front side of said semiconductor substrate forming a counterelectrode of the antiparallel diode.

2. The IGBT according to claim 1, wherein said semiconductor wells at least predominantly contain transistor cells.

3. The IGBT according to claim 1, wherein said at least one emitter short region reaches as far as a chip end in edge regions of the IGBT.

4. The IGBT according to claim 1, wherein edge regions of the IGBT contain one or more emitter regions at said high-voltage edge.

5. The IGBT according to claim 1, wherein said at least one emitter short regions is one of a plurality of emitter short regions.

6. The IGBT according to claim 5, wherein said at least one emitter region is integrated in contiguous fashion, and said emitter short regions are integrated in insular fashion.

7. The IGBT according to claim 6, wherein said emitter short regions are integrated strip-shaped emitter short regions.

8. The IGBT according to claim 7, wherein said strip-shaped emitter short regions extend obliquely with respect to said high-voltage edge.

9. The IGBT according to claim 7, wherein said emitter short regions are integrated annular strips.

10. The IGBT according to claim 6, wherein said emitter short regions are integrated punctiform regions.

11. The IGBT according to claim 10, wherein said emitter short regions form a ring of punctiform islands below said high-voltage edge.

12. The IGBT according to claim 1, wherein said at least one emitter short region is integrated without alignment with respect to said transistor cells.

13. An IGBT with a monolithically integrated antiparallel diode, comprising:

a semiconductor substrate forming an inner zone and having a front side, a rear side, and a peripheral high-voltage edge;

said front side of said semiconductor substrate having semiconductor wells of a first conductivity type formed therein with transistor cells within said peripheral high-voltage edge;

at least one emitter region of the first conductivity type formed at said rear side of said semiconductor substrate;

at least one emitter short region (39, 49a, 49b, 49c, 49d, 49e) of a second conductivity type lying in a plane with said at least one emitter region and forming an electrode of the antiparallel diode;

said emitter region and said at least one emitter short region having a thickness of less than 1 micrometer and said emitter region having a doping with a dose of between $1 \cdot 10^{12}$ and $1 \cdot 10^{15}$ charge carriers per cm^2.

14. The IGBT according to claim 13, wherein a lifetime of minority charge carriers in said semiconductor substrate is at least 10 µs.

15. The IGBT according to claim 13, wherein a thickness of said inner zone formed by said substrate is less than 200 µm.

16. The IGBT according to claim 13, which comprises a field stop region of the second conductivity type integrated between said substrate and said emitter region and emitter short region.

17. The IGBT according to claim 13, wherein said substrate forming said inner zone is weakly doped, and said emitter region is heavily doped with a significantly higher doping concentration than said inner zone.

18. The IGBT according to claim 13, wherein said at least one emitter region is annealed at a temperature of less than 600°C.

19. The IGBT according to claim 13, wherein the first conductivity type is the p-conductivity type and the second conductivity type is the n-conductivity type.